Claims:

1. A method for controlling a welding process or a welding current source using a consumable electrode, in which a welding process adjusted on the basis of several different welding parameters and controlled by a control device is carried out by a welding current source after the ignition of an electric arc, characterized in that at least two different welding process phases having different energy inputs resulting from different material transitions and/or electric arc types are cyclically combined during the welding process to influence or control the heat balance and, in particular, the heat input into the workpiece (16) to be worked.

2. A method according to claim 1, characterized in that at least one welding process phase having a high energy input and one welding process phase having a low energy input are cyclically combined during the welding process.

3. A method according to claim 2, characterized in that a pulse current phase (27) as said welding process phase having a high energy input and a cold-metal-transfer phase (28) as said welding process phase having a low energy input are cyclically combined during the welding process.

4. A method according to claim 2, characterized in that a spray-arc phase as said welding process phase having a high energy input and a cold-metal-transfer phase as said welding process phase having a low energy input are cyclically combined during the welding process.

5. A method according to claim 2, characterized in that a pulse current phase spray-arc phase as said welding process phase having a high energy input and a short-circuit phase as said welding process phase having a low energy input are cyclically combined during the welding process.

6. A method according to claim 3 or 4, characterized in that, during the cold-metal-transfer phase (28), the welding wire (13)

tacting the same, and the wire conveyance is subsequently reversed after the creation of a short circuit, thus conveying the welding wire (13) back as far as to a predefined distance (30) from the workpiece (16).

7. A method according to claim 6, characterized in that, during the conveyance of the welding wire (13) in the direction of the workpiece (16), the welding current (I) is changed, particularly increased, so as to induce the formation of a droplet and the incipient melting of the end of the welding wire.

8. A method according to claim 6 or 7, characterized in that the welding wire (13) is moved back after having contacted the workpiece (16), thus detaching the droplet (32) and the incipiently melted material from the welding wire (13).

9. A method according to one or several of claims 1 to 8, characterized in that the duration of the individual welding process phases is controlled as a function of the adjusted welding current (I) and, in particular, directly proportionally to the adjusted welding current (I) or an adjusted power, respectively.

10. A method according to one or several of claims 2 to 9, characterized in that the ratio between the welding process phase having a high energy input and the welding process phase having a low energy input is changed as a function of the welding current (I) or an adjusted power, respectively.

11. A method according to one or several of claims 2 to 10, characterized in that at least one welding parameter of the heat input into the workpiece (16) to be worked is selected or adjusted on the welding apparatus (1), with the ratio between the welding process phase having a high energy input and the welding process phase having a low energy input being automatically determined and controlled as a function of the selected or adjusted heat input value.

12. A method according to one or several of claims 1 to 11, characterized in that the ratio of the cyclically alternating

meters used for the welding process such as, for instance, a welding current (I) and/or a parameter for the heat input and/or the material of the workpiece (16) to be worked and/or the material of the welding wire (13) and/or the employed welding gas.

13. A method according to one or several of claims 3 to 12, characterized in that the cold-metal-transfer phase (28) is initiated by specifying the number of pulses in the pulse current phase (27) or by predetermining a time period or by applying a trigger signal.

14. A method according to one or several of claims 1 to 13, characterized in that the welding process is started according to the lift-arc principle.

15. A method according to one or several of claims 1 to 14, characterized in that an additional welding process phase having a high energy input is implemented over a defined period upon ignition of the electric arc (15) and prior to the cyclic alternation of the at least two different welding process phases.

16. A method according to one or several of claims 3 to 15, characterized in that the energy input, in particular the welding current (I), during the cold-metal-transfer phase (28) is lower than the energy input, in particular the welding current (I), during the pulse current phase (27).

17. A method according to one or several of claims 1 to 16, characterized in that the wire advance speed is changed during the different welding process phases.

18. A welding apparatus (1) including a welding current source (2), a control device (4) and a welding torch (10), wherein different welding parameters are adjustable via an input and/or output device (40) provided on the welding apparatus, or via a remote controller, characterized in that at least one parameter for the heat balance or the heat input into the workpiece (16) to be worked is selectable at the input and/or output device of the welding apparatus and/or a remote controller, and/or an ad-

ance or heat input into the workpiece (16) to be worked, via a cyclic combination of at least two welding process phases having different energy inputs.

19. A welding device according to claim 18, characterized by an embodiment for carrying out the method according to one or several of claims 1 to 16.

20. A welding device according to claim 18 or 19, characterized in that a further selection or adjustment element (46) is provided for the selection of the welding process phases to be used.

21. A welding device according to any one of claims 18 to 20, characterized in that at least one display (42, 43, 44, 45) is provided for the representation of the selected welding parameters and/or the selected welding process phases.

22. A welding device according to one or several of claims 18 to 21, characterized in that a selection or adjustment element (46) is provided for the selection of the material of the workpiece (16) to be worked.

23. A welding device according to one or several of claims 18 to 22, characterized in that a selection or adjustment element (46) is provided for the selection of the material of the employed welding wire (13).

24. A welding device according to one or several of claims 18 to 23, characterized in that a cyclic combination of a pulse welding process with a cold-metal-transfer welding process is adjustable at the input and/or output device (40).

25. A welding device according to one or several of claims 18 to 23, characterized in that a cyclic combination of a spray-arc welding process with a cold-metal-transfer welding process is adjustable at the input and/or output device (40).

26. A welding device according to one or several of claims 18 to

circuit arc welding process with a cold-metal-transfer welding process is adjustable at the input and/or output device (40).

27. A welding device according to one or several of claims 18 to 23, characterized in that a cyclic combination of a pulse welding process with a spray-arc welding process is adjustable at the input and/or output device (40).

28. A welding device according to one or several of claims 18 to 27, characterized in that a selection or adjustment element (48) is provided for the adjustment of the ratio of the selected welding process phases and, in particular, the duration of the respective welding process phase.

29. A welding device according to one or several of claims 18 to 28, characterized in that a memory is provided for the storage of welding parameter adjustments.